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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/841,800	04/24/2001	Maximilian A. Biberger	SSI-02001	6810

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EXAMINER

EVERHART, CARIDAD

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 07/29/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/841,800

Applicant(s)

BIBERGER ET AL.

Examiner

Caridad M. Everhart

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,5,6
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily

published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 19 and 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Wallace, et al. (US 6,024,801B1).

Wallace, et al disclose the steps of maintaining supercritical CO₂ and one or more additives in contact with a substrate to remove impurities, and depositing a film on the substrate (col. 5, lines 1-20; col. 8, lines 30-35 and 57-63). The process is carried out without exposing the substrate to the environment (col. 5, lines 10-30).

Claims 1-3, 10,11,12,14,16,17,18,20-23,and 25-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaarstra (US 6,242,165B1) in view of Wallace et al.

Vaarstra discloses the steps of providing a supercritical CO₂ in order to remove impurities from the surface of the substrate(col. 4, ines 25-30, 58-65; col. 5, lines 50-58). There may be additives, including organic and inorganic acids (col. 6, lines 14-23).

Although Vaarstra does not disclose depositing a metal, Vaarstra discloses a high aspect ratio via (col. 7, lines 15-22), and it is conventional to fill high aspect ratio vias with metal.

Wallace et al is relied upon as discussed above for its teaching of not exposing the substrate to the environment. One of ordinary skill in the art would have been motivated to have combined the teaching of Wallace et al with the process taught by Vaarstra in order to prevent the contamination of the substrate with impurities, as taught by Wallace.

Claims 4-5, 7-9, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaartstra in view of Wallace et al as applied to claim 1 above and further in view of Starov, et al (US 6,228,563B1)("Starov").

Vaartstra in view of Wallace does not disclose copper nor copper oxide removal nor aluminum oxide removal.

Starov discloses using supercritical CO₂ with the addition of organic or inorganic acids and a chelating agent such as EDTA to remove residues and contaminants from a substrate, including copper oxides from copper surfaces (col. 7, lines 34-36; col. 9, lines 42-48; col. 10, lines 35-46, 60-67). Aluminum oxide removal is also disclosed (col. 1, lines 55-60).

An amine which is related to the class of amines recited in claim 15 may be a cosolvent (col. 10, lines 52-55), so that it would have been within the ordinary skill in the art to have chosen one of the recited amines.

One of ordinary skill in the art would have been motivated to have combined the disclosure made by Starov with the process taught by Vaartstra in view of Wallace because Vaartstra in view of Wallace discloses that the substrate taught by Vaarstra can include other material layers, such as conductors (col. 4, ines 48-57), and copper is conventional in the art.

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Vaarstra ("Vaartstra I") in view of Wallace further in view of Starov, et al and further in view of Vaartstra (US 6,149,828)("Vaatrstra II").

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Vaartstra I in view of Wallace in view of Starov does not disclose the recited acids.

Vaartstra II discloses that acetic acid may be the organic acid additive (col. 3, lines 62-67).

One of ordinary skill in the art would have been motivated to have used acetic acid in the process taught by Vaartstra I in view of Wallace further in view of Starov because Vaartstra I in view of Wallace further in view of Starov teach that an organic acid may be an additive.

Claims 31-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Starov, et al. in view of Wallace, et al. .

Starov discloses an apparatus which includes a transfer module including a first robot (col. 18, lines 17-20) ; a supercritical processing module coupled to the transfer module(col. 20, lines 47-40); a second module(col. 26, lines 25-30); and a vacuum module , in this case a purge device, coupling the second module to the supercritical processing module and a second robot(col. 20, lines 36-50 and col. 21, lines 10-35).

Starov does not teach a metal deposition module as the second module.

Wallace discloses an apparatus in which supercritical cleaning takes place, and in which the deposition step takes place without withdrawing the substrate from the vacuum environment and discloses that in a cluster tool a supercritical processing chamber can be placed between process chambers (col. 3, lines 60-67).

One of ordinary skill in the art would have been motivated to have used a deposition chamber as the second chamber taught by Starov in order for the substrate

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not to be exposed to the environment after the supercritical cleaning , as taught by Wallace, and because Wallace discloses that placing a supercritical process chamber between other process modules in a cluster tool is known in the art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 703-308-3455. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 703-308-1323. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.


CARIDAD EVERHART
PRIMARY EXAMINER

C. Everhart
July 25, 2002